



SEQUENCE LISTING

<110> DRUILHE, Pierre

<120> GLURP-MSP3 FUSION PROTEIN, IMMUNOGENIC COMPOSITIONS AND MALARIAL VACCINES CONTAINING IT

<130> B5768 - AD/VMA/VG

<140> New US Patent Application

<141> 2003-10-24

<160> 7

<170> PatentIn version 3.1

<210> 1

<211> 491

<212> PRT

<213> P. Falciparum

<220>

<221> misc_feature

<222> (1)..(491)

<223> GLURP amino acids 24 - 514

<400> 1

Lys Thr Asn Thr Ser Glu Asn Arg Asn Lys Arg Ile Gly Gly Pro Lys
1 5 10 15

Leu Arg Gly Asn Val Thr Ser Asn Ile Lys Phe Pro Ser Asp Asn Lys
20 25 30

Gly Lys Ile Ile Arg Gly Ser Asn Asp Lys Leu Asn Lys Asn Ser Glu
35 40 45

Asp Val Leu Glu Gln Ser Glu Lys Ser Leu Val Ser Glu Asn Val Pro
50 55 60

Ser Gly Leu Asp Ile Asp Asp Ile Pro Lys Glu Ser Ile Phe Ile Gln
65 70 75 80

Glu Asp Gln Glu Gly Gln Thr His Ser Glu Leu Asn Pro Glu Thr Ser
85 90 95

Glu His Ser Lys Asp Leu Asn Asn Asn Asp Ser Lys Asn Glu Ser Ser
100 105 110

Asp Ile Ile Ser Val Asn Asn Lys Ser Asn Lys Val Gln Asn His Phe
115 120 125

Glu Ser Leu Ser Asp Leu Glu Leu Leu Glu Asn Ser Ser Gln Asp Asn
130 135 140

Leu Asp Lys Asp Thr Ile Ser Thr Glu Pro Phe Pro Asn Gln Lys His
145 150 155 160

Lys Asp Leu Gln Gln Asp Leu Asn Asp Glu Pro Leu Glu Pro Phe Pro
165 170 175

Thr Gln Ile His Lys Asp Tyr Lys Glu Lys Asn Leu Ile Asn Glu Glu
180 185 190

Asp Ser Glu Pro Phe Pro Arg Gln Lys His Lys Lys Val Asp Asn His
195 200 205

Asn Glu Glu Lys Asn Val Phe His Glu Asn Gly Ser Ala Asn Gly Asn
210 215 220

Gln Gly Ser Leu Lys Leu Lys Ser Phe Asp Glu His Leu Lys Asp Glu
225 230 235 240

Lys Ile Glu Asn Glu Pro Leu Val His Glu Asn Leu Ser Ile Pro Asn
245 250 255

Asp Pro Ile Glu Gln Ile Leu Asn Gln Pro Glu Gln Glu Thr Asn Ile
260 265 270

Gln Glu Gln Leu Tyr Asn Glu Lys Gln Asn Val Glu Glu Lys Gln Asn
275 280 285

Ser Gln Ile Pro Ser Leu Asp Leu Lys Glu Pro Thr Asn Glu Asp Ile
290 295 300

Leu Pro Asn His Asn Pro Leu Glu Asn Ile Lys Gln Ser Glu Ser Glu
305 310 315 320

Ile Asn His Val Gln Asp His Ala Leu Pro Lys Glu Asn Ile Ile Asp
325 330 335

Lys Leu Asp Asn Gln Lys Glu His Ile Asp Gln Ser Gln His Asn Ile
340 345 350

Asn Val Leu Gln Glu Asn Asn Ile Asn Asn His Gln Leu Glu Pro Gln
355 360 365

Glu Lys Pro Asn Ile Glu Ser Phe Glu Pro Lys Asn Ile Asp Ser Glu
370 375 380

Ile Ile Leu Pro Glu Asn Val Glu Thr Glu Glu Ile Ile Asp Asp Val
385 390 395 400

Pro Ser Pro Lys His Ser Asn His Glu Thr Phe Glu Glu Glu Thr Ser
405 410 415

Glu Ser Glu His Glu Glu Ala Val Ser Glu Lys Asn Ala His Glu Thr
420 425 430

Val Glu His Glu Glu Thr Val Ser Gln Glu Ser Asn Pro Glu Lys Ala
435 440 445

Asp Asn Asp Gly Asn Val Ser Gln Asn Ser Asn Asn Glu Leu Asn Glu
450 455 460

Asn Glu Phe Val Glu Ser Glu Lys Ser Glu His Glu Pro Ala Glu Asn
465 470 475 480

Glu Glu Ser Ser Leu Glu Glu Gly His His Glu
485 490

<210> 2
<211> 169
<212> PRT
<213> P. Falciparum

<220>
<221> MISC_FEATURE
<222> (1)..(169)
<223> MSP3 amino acids 212 - 380

<400> 2

Lys Glu Ala Ser Ser Tyr Asp Tyr Ile Leu Gly Trp Glu Phe Gly Gly
1 5 10 15

Gly Val Pro Glu His Lys Lys Glu Glu Asn Met Leu Ser His Leu Tyr
20 25 30

Val Ser Ser Lys Asp Lys Glu Asn Ile Ser Lys Glu Asn Asp Asp Val
35 40 45

Leu Asp Glu Lys Glu Glu Glu Ala Glu Glu Thr Glu Glu Glu Glu Leu
50 55 60

Glu Glu Lys Asn Glu Glu Glu Thr Glu Ser Glu Ile Ser Glu Asp Glu
65 70 75 80

Glu Glu Glu Glu Glu Glu Glu Lys Glu Glu Glu Asn Glu Lys Lys Lys
85 90 95

Glu Gln Glu Lys Glu Gln Ser Asn Glu Asn Asn Asp Gln Lys Lys Asp
100 105 110

Met Glu Ala Gln Asn Leu Ile Ser Lys Asn Gln Asn Asn Asn Glu Lys
115 120 125

Asn Val Lys Glu Ala Ala Glu Ser Ile Met Lys Thr Leu Ala Gly Leu
130 135 140

Ile Lys Gly Asn Asn Gln Ile Asp Ser Thr Leu Lys Asp Leu Val Glu
145 150 155 160

Glu Leu Ser Lys Tyr Phe Lys Asn His
165

<210> 3
<211> 647
<212> PRT
<213> Artificial Sequence

<220>
<223> protein

<220>
<221> MISC_FEATURE
<222> (1)..(647)
<223> GLURP MSP3 fusion protein

<400> 3

Thr Ser Glu Asn Arg Asn Lys Arg Ile Gly Gly Pro Lys Leu Arg Gly
1 5 10 15

Asn Val Thr Ser Asn Ile Lys Phe Pro Ser Asp Asn Lys Gly Lys Ile
20 25 30

Ile Arg Gly Ser Asn Asp Lys Leu Asn Lys Asn Ser Glu Asp Val Leu
35 40 45

Glu Gln Ser Glu Lys Ser Leu Val Ser Glu Asn Val Pro Ser Gly Leu
50 55 60

Asp Ile Asp Asp Ile Pro Lys Glu Ser Ile Phe Ile Gln Glu Asp Gln
65 70 75 80

Glu Gly Gln Thr His Ser Glu Leu Asn Pro Glu Thr Ser Glu His Ser
85 90 95

Lys Asp Leu Asn Asn Asn Gly Ser Lys Asn Glu Ser Ser Asp Ile Ile
100 105 110

Ser Glu Asn Asn Lys Ser Asn Lys Val Gln Asn His Phe Glu Ser Leu
115 120 125

Ser Asp Leu Glu Leu Leu Glu Asn Ser Ser Gln Asp Asn Leu Asp Lys
130 135 140

Asp Thr Ile Ser Thr Glu Pro Phe Pro Asn Gln Lys His Lys Asp Leu
145 150 155 160

Gln Gln Asp Leu Asn Asp Glu Pro Leu Glu Pro Phe Pro Thr Gln Ile
165 170 175

His Lys Asp Tyr Lys Glu Lys Asn Leu Ile Asn Glu Glu Asp Ser Glu
180 185 190

Pro Phe Pro Arg Gln Lys His Lys Lys Val Asp Asn His Asn Glu Glu
195 200 205

Lys Asn Val Phe His Glu Asn Gly Ser Ala Asn Gly Asn Gln Gly Ser
210 215 220

Leu Lys Leu Lys Ser Phe Asp Glu His Leu Lys Asp Glu Lys Ile Glu
225 230 235 240

Asn Glu Pro Leu Val His Glu Asn Leu Ser Ile Pro Asn Asp Pro Ile
245 250 255

Glu Gln Ile Leu Asn Gln Pro Glu Gln Glu Thr Asn Ile Gln Glu Gln
260 265 270

Leu Tyr Asn Glu Lys Gln Asn Val Glu Glu Lys Gln Asn Ser Gln Ile
275 280 285

Pro Ser Leu Asp Leu Lys Glu Pro Thr Asn Glu Asp Ile Leu Pro Asn
290 295 300

His Asn Pro Leu Glu Asn Ile Lys Gln Ser Glu Ser Glu Ile Asn His
305 310 315 320

Val Gln Asp His Ala Leu Pro Lys Glu Asn Ile Ile Asp Lys Leu Asp
325 330 335

Asn Gln Lys Glu His Ile Asp Gln Ser Gln His Asn Ile Asn Val Leu
340 345 350

Gln Glu Asn Asn Ile Asn Asn His Gln Leu Glu Pro Gln Glu Lys Pro
355 360 365

Asn Ile Glu Ser Phe Glu Pro Lys Asn Ile Asp Ser Glu Ile Ile Leu
370 375 380

Pro Glu Asn Val Glu Thr Glu Glu Ile Ile Asp Asp Val Pro Ser Pro
385 390 395 400

Lys His Ser Asn His Glu Thr Phe Glu Glu Glu Thr Ser Glu Ser Glu
405 410 415

His Glu Glu Ala Val Ser Glu Lys Asn Ala His Glu Thr Val Glu His
420 425 430

Glu Glu Thr Val Ser Gln Glu Ser Asn Pro Glu Lys Ala Asp Asn Asp
435 440 445

Gly Asn Val Ser Gln Asn Ser Asn Asn Glu Leu Asn Glu Asn Glu Phe
450 455 460

Val Glu Ser Glu Lys Ser Glu His Glu Ala Arg Ser Lys Ala Lys Glu
465 470 475 480

Ala Ser Ser Tyr Asp Tyr Ile Leu Gly Trp Glu Phe Gly Gly Gly Val
485 490 495

Pro Glu His Lys Lys Glu Glu Asn Met Leu Ser His Leu Tyr Val Ser
500 505 510

Ser Lys Asp Lys Glu Asn Ile Ser Lys Glu Asn Asp Asp Val Leu Asp
515 520 525

Glu Lys Glu Glu Glu Ala Glu Glu Thr Glu Glu Glu Glu Leu Glu Glu
530 535 540

Lys Asn Glu Glu Glu Thr Glu Ser Glu Ile Ser Glu Asp Glu Glu Glu
 545 550 555 560

Glu Glu Glu Glu Glu Lys Glu Glu Glu Asn Glu Lys Lys Lys Glu Gln
 565 570 575

Glu Lys Glu Gln Ser Asn Glu Asn Asn Asp Gln Lys Lys Asp Met Glu
 580 585 590

Ala Gln Asn Leu Ile Ser Lys Asn Gln Asn Asn Asn Glu Lys Asn Val
 595 600 605

Lys Glu Ala Ala Glu Ser Ile Met Lys Thr Leu Ala Gly Leu Ile Lys
 610 615 620

Gly Asn Asn Gln Ile Asp Ser Thr Leu Lys Asp Leu Val Glu Glu Leu
 625 630 635 640

Ser Lys Tyr Phe Lys Asn His
 645

<210> 4
 <211> 1941
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> DNA

<400> 4
 acaagtgaga atagaaataa acgaatcggg ggtcctaaat taaggggtaa tgttacaagt 60
 aatataaagt tcccatcaga taacaaagggt aaaattataa gaggttcgaa tgataaactt 120
 aataaaaaact ctgaagatgt tttagaacaa agcgaaaaat cgcttgtttc agaaaatggt 180
 cctagtggat tagatataga tgatatccct aaagaatcta tttttattca agaagatcaa 240
 gaaggtcaaa ctcatcttga attaaatcct gaaacatcag aacatagtaa agatttaa 300
 aataatgggt caaaaaatga atctagtgat attatttcag aaaataataa atcaaataaa 360
 gtacaaaatc attttgaatc attatcagat ttagaattac ttgaaaattc ctcacaagat 420
 aatttagaca aagatacaat ttcaacagaa ccttttccta atcaaaaaca taaagactta 480
 caacaagatt taaatgatga acctttagaa ccctttccta cacaaatata taaagattat 540
 aaagaaaaaa atttaataaa tgaagaagat tcagaacat ttcccagaca aaagcataaa 600
 aaggtagaca atcataatga agaaaaaac gtatttcatg aaaatgggtc tgcaaaggt 660

aatcaaggaa gtttgaaact taaatcattc gatgaacatt taaaagatga aaaaatagaa	720
aatgaaccac ttgttcatga aaatttatcc ataccaaatg atccaataga acaaataatta	780
aatcaacctg aacaagaaac aaatatccag gaacaattgt ataatgaaaa acaaaatggt	840
gaagaaaaac aaaatttctca aataccttcg ttagatttaa aagaaccaac aaatgaagat	900
attttaccaa atcataatcc attagaaaat ataaaacaaa gtgaatcaga aataaatcat	960
gtacaagatc atgcgctacc aaaagagaat ataatagaca aacttgataa tcaaaaagaa	1020
cacatcgatc aatcacaaca taatataaat gtattacaag aaaataacat aaacaatcac	1080
caattagaac ctcaagagaa acctaataat gaatcgtttg aacctaaaaa tatagattca	1140
gaaattattc ttctgaaaa tgttgaaaca gaagaaataa tagatgatgt gccttcccct	1200
aaacattcta accatgaaac atttgaagaa gaaacaagtg aatctgaaca tgaagaagcc	1260
gtatctgaaa aaaatgccca cgaaactgtc gaacatgaag aaactgtgtc tcaagaaagc	1320
aatcctgaaa aagctgataa tgatggaaat gtatctcaaa acagcaacaa cgaattaaat	1380
gaaaatgaat tcgttgaatc ggaaaaaagc gagcatgaag caagatctaa agcaaaagaa	1440
gcttctagtt atgattatat tttaggttgg gaatttggag gaggcgttcc agaacacaaa	1500
aaagaagaaa atatgttatc acatttatat gtttcttcaa aggataagga aaatatatct	1560
aaggaaaatg atgatgtatt agatgagaag gaagaagagg cagaagaaac agaagaagaa	1620
gaacttgaag aaaaaaatga agaagaaaca gaatcagaaa taagtgaaga tgaagaagaa	1680
gaagaagaag aagaaaagga agaagaaaat gaaaaaaaaa aagaacaaga aaaagaacaa	1740
agtaatgaaa ataatgatca aaaaaaagat atggaagcac agaatttaat ttctaaaaac	1800
cagaataata atgagaaaaa cgtaaaagaa gctgctgaaa gcatcatgaa aactttagct	1860
ggtttaatca agggaaataa tcaaatagat tctaccttaa aagatttagt agaagaatta	1920
tccaaatatt ttaaaaatca t	1941

<210> 5
 <211> 27
 <212> PRT
 <213> P. Falciparum

<220>
 <221> MISC_FEATURE
 <222> (1)..(27)
 <223> MSP3b

<400> 5

Ala Lys Glu Ala Ser Ser Tyr Asp Tyr Ile Leu Gly Trp Glu Phe Gly

1 5 10 15

Gly Gly Val Pro Glu His Lys Lys Glu Glu Asn
20 25

<210> 6
<211> 41
<212> PRT
<213> P. Falciparum

<220>
<221> MISC_FEATURE
<222> (1)..(41)
<223> MSP3d

<400> 6

Met Leu Ser His Leu Tyr Val Ser Ser Lys Asp Lys Glu Asn Ile Ser
1 5 10 15

Lys Glu Asn Asp Asp Val Leu Asp Glu Lys Glu Glu Glu Ala Glu Glu
20 25 30

Thr Glu Glu Glu Glu Leu Glu Glu Lys
35 40

<210> 7
<211> 188
<212> PRT
<213> P. Falciparum

<220>
<221> MISC_FEATURE
<222> (1)..(188)
<223> MSP3a to MSP3f

<400> 7

Tyr Glu Lys Ala Lys Asn Ala Tyr Gln Lys Ala Asn Gln Ala Val Leu
1 5 10 15

Lys Ala Lys Glu Ala Ser Ser Tyr Asp Tyr Ile Leu Gly Trp Glu Phe
20 25 30

Gly Gly Gly Val Pro Glu His Lys Lys Glu Glu Asn Met Leu Ser His
35 40 45

Leu Tyr Val Ser Ser Lys Asp Lys Glu Asn Ile Ser Lys Glu Asn Asp
50 55 60

Asp Val Leu Asp Glu Lys Glu Glu Glu Ala Glu Glu Thr Glu Glu Glu
65 70 75 80

Glu Leu Glu Glu Lys Asn Glu Glu Glu Thr Glu Ser Glu Ile Ser Glu
85 90 95

Asp Glu Glu Glu Glu Glu Glu Glu Glu Lys Glu Glu Glu Asn Asp
100 105 110

Lys Lys Lys Glu Gln Glu Lys Glu Gln Ser Asn Glu Asn Asn Asp Gln
115 120 125

Lys Lys Asp Met Glu Ala Gln Asn Leu Ile Ser Lys Asn Gln Asn Asn
130 135 140

Asn Glu Lys Asn Val Lys Glu Ala Ala Glu Ser Ile Met Lys Thr Leu
145 150 155 160

Ala Gly Leu Ile Lys Gly Asn Asn Gln Ile Asp Ser Thr Leu Lys Asp
165 170 175

Leu Val Glu Glu Leu Ser Lys Tyr Phe Lys Asn His
180 185